

WHAT IS CLAIMED IS:

1                    1.        An apparatus for processing substrates, comprising:  
2                    an atmospheric coating system;  
3                    a first transfer chamber disposed in said atmospheric coating system;  
4                    a first substrate handling member disposed in said first transfer chamber;  
5                    a cure system in communication with said first transfer chamber;  
6                    a second transfer chamber disposed in said cure system;  
7                    a second substrate handling member disposed in said second transfer  
8 chamber;  
9                    a loadlock chamber in communication with said second transfer  
10 chamber;  
11                    a cap system in communication with said loadlock chamber;  
12                    a third transfer chamber disposed in said cap system; and  
13                    a third substrate handling system disposed in said third transfer chamber.

1                    2.        The apparatus of claim 1 wherein said atmospheric coating  
2 system comprises:  
3                    one or more substrate coating modules in communication with said first  
4 transfer chamber; and  
5                    one or more substrate bake modules in communication with said first  
6 transfer chamber.

1                    3.        The apparatus of claim 2 wherein said substrate coating module  
2 comprises a spin-on deposition module.

1                    4.        The apparatus of claim 2 further comprising one or more  
2 substrate cooling modules in communication with said first transfer chamber.

1                    5.        The apparatus of claim 1 wherein said cure system comprises  
2 one or more cure chambers in communication with said second transfer chamber.

1                    6.        The apparatus of claim 5 wherein said cure chamber is in fluid  
2 communication with a vacuum pump.

1                   7.     The apparatus of claim 5 wherein said cure chamber comprises  
2 an electron beam radiation source.

1                   8.     The apparatus of claim 5 wherein said cure chamber is in fluid  
2 communication with a gas distribution system configured to deliver process gases from  
3 one or more gas sources.

1                   9.     The apparatus of claim 1 wherein said cure system further  
2 comprises a vacuum pump in fluid communication with said second transfer chamber.

1                   10.    The apparatus of claim 1 further comprising a vacuum pump in  
2 fluid communication with said loadlock chamber.

1                   11.    The apparatus of claim 1 wherein said cap system comprises:  
2 one or more processing chambers, each one of said processing chamber  
3 defining at least one isolated processing region therein, wherein each processing region  
4 is connected with said third transfer chamber.

1                   12.    The apparatus of claim 11 wherein a vacuum pump is in fluid  
2 communication with said one or more processing chambers.

1                   13.    The apparatus of claim 11 wherein said processing region  
2 includes a gas distribution assembly disposed therein and each gas distribution  
3 assembly receives process gases from one or more gas sources.

1                   14.    The apparatus of claim 11 further comprising a plasma system  
2 having a RF generator connected with each processing region.

1                   15.    The apparatus of claim 1 wherein while a substrate is being  
2 processed in said apparatus, said substrate is unexposed to an environment that is  
3 external to said apparatus.

1                   16.    The apparatus of claim 1 wherein said coat system, said cure  
2 system and said cap system are not in fluid communication with an environment  
3 external to said apparatus while a substrate is being processed in said apparatus, so as to  
4 prevent the exposure of said substrate to an environment external to said apparatus.

1                   17.     The apparatus of claim 1 wherein while a substrate is being  
2 processed in said cure system and said cap system, said substrate's temperature remains  
3 approximately above 100°C, thus preventing the condensation of moisture on said  
4 substrate.

1                   18.     The apparatus of claim 1 wherein while a substrate is transferred  
2 by said second substrate handler from said cure system to said cap system, said  
3 substrate's temperature remains above approximately 100°C, thus preventing the  
4 condensation of moisture on said substrate.

1                   19.     The apparatus of claim 1 wherein while a substrate is transferred  
2 by said second substrate handler from said cure system to said cap system, said  
3 substrate is not exposed to an environment external to said apparatus.

1                   20.     The apparatus of claim 1 wherein while a substrate is transferred  
2 by said second substrate handler from said cure system to said cap system, said  
3 substrate's temperature remains above approximately 100°C, thus preventing the  
4 condensation of moisture on said substrate, and said substrate is not exposed to an  
5 environment external to said apparatus.

1                   21.     An apparatus for processing substrates, comprising:  
2 an atmospheric coating system;  
3 a first transfer chamber disposed in said atmospheric coating system;  
4 a first substrate handling member disposed in said first transfer chamber;  
5 a cure system in communication with said first transfer chamber;  
6 a second transfer chamber disposed in said cure system; and  
7 a second substrate handling member disposed in said second transfer  
8 chamber.

1                   22.     The apparatus of claim 21 wherein said atmospheric coating  
2 system comprises:  
3 one or more substrate coating modules in communication with said first  
4 transfer chamber; and  
5 one or more substrate bake modules in communication with said first  
6 transfer chamber.

1                   23.     The apparatus of claim 22 wherein said substrate coating module  
2 comprises a spin-on deposition module.

1                   24.     The apparatus of claim 22 further comprising one or more  
2 substrate cooling modules in communication with said first transfer chamber.

1                   25.     The apparatus of claim 21 wherein said cure system comprises  
2 one or more cure chambers in communication with said second transfer chamber.

1                   26.     The apparatus of claim 25 wherein said cure chamber is in fluid  
2 communication with a vacuum pump.

1                   27.     The apparatus of claim 25 wherein said cure chamber comprises  
2 an electron beam radiation source.

1                   28.     The apparatus of claim 25 wherein said cure chamber is in fluid  
2 communication with a gas distribution system configured to deliver process gases from  
3 one or more gas sources.

1                   29.     The apparatus of claim 21 wherein said cure system further  
2 comprises a vacuum pump in fluid communication with said second transfer chamber.

1                   30.     The apparatus of claim 21 wherein while a substrate is being  
2 processed in said apparatus, said substrate is unexposed to an environment that is  
3 external to said apparatus.

1                   31.     The apparatus of claim 21 wherein said coat system and said  
2 cure system are not in fluid communication with an environment external to said  
3 apparatus while a substrate is being processed in said apparatus, so as to prevent the  
4 exposure of said substrate to an environment external to said apparatus.

1                   32.     An apparatus for processing substrates, comprising:  
2 a cure system;  
3 a cure system transfer chamber disposed in said cure system;  
4 a cure system substrate handling member disposed in said cure system  
5 transfer chamber;

6                   a loadlock chamber in communication with said cure system transfer  
7 chamber;  
8                   a cap system in communication with said loadlock chamber;  
9                   a cap system transfer chamber disposed in said cap system; and  
10                  a cap system substrate handling member disposed in said cap system  
11 transfer chamber.

1                   33.     The apparatus of claim 32 wherein said cure system comprises  
2 one or more cure chambers in communication with said cure system transfer chamber.

1                   34.     The apparatus of claim 33 wherein said cure chamber is in fluid  
2 communication with a vacuum pump.

1                   35.     The apparatus of claim 33 wherein said cure chamber comprises  
2 an electron beam radiation source.

1                   36.     The apparatus of claim 33 wherein said cure chamber is in fluid  
2 communication with a gas distribution system configured to deliver process gases from  
3 one or more gas sources.

1                   37.     The apparatus of claim 32 wherein said cure system further  
2 comprises a vacuum pump in fluid communication with said cure system transfer  
3 chamber.

1                   38.     The apparatus of claim 32 further comprising a vacuum pump in  
2 fluid communication with said loadlock chamber.

1                   39.     The apparatus of claim 32 wherein said cap system comprises:  
2                   one or more processing chambers, each one of said processing chamber  
3 defining at least one isolated processing region therein, wherein each processing region  
4 is connected with said cap system transfer chamber.

1                   40.     The apparatus of claim 39 wherein a vacuum pump is in fluid  
2 communication with said one or more processing chambers.

1                   41.     The apparatus of claim 39 wherein said processing region  
2 includes a gas distribution assembly disposed therein and each gas distribution  
3 assembly receives process gases from one or more gas sources.

1                   42.     The apparatus of claim 39 further comprising a plasma system  
2 having a RF generator connected with each processing region.

1                   43.     The apparatus of claim 32 wherein while a substrate is being  
2 processed in said apparatus, said substrate is unexposed to an environment that is  
3 external to said apparatus.

1                   44.     The apparatus of claim 32 wherein said cure system and said cap  
2 system are not in fluid communication with an environment external to said apparatus  
3 while a substrate is being processed in said apparatus, to prevent the exposure of said  
4 substrate to an environment external to said apparatus.

1                   45.     The apparatus of claim 32 wherein while a substrate is being  
2 processed in said cure system and said cap system, said substrate's temperature remains  
3 approximately above 100 °C, thus preventing the condensation of moisture on said  
4 substrate.

1                   46.     The apparatus of claim 32 wherein while a substrate is  
2 transferred by said cure system substrate handler from said cure system to said cap  
3 system, said substrate's temperature remains above approximately 100°C, thus  
4 preventing the condensation of moisture on said substrate.

1                   47.     The apparatus of claim 32 wherein while a substrate is  
2 transferred by said cure system substrate handler from said cure system to said cap  
3 system, said substrate is not exposed to an environment external to said apparatus.

1                   48.     The apparatus of claim 32 wherein while a substrate is  
2 transferred by said cure system substrate handler from said cure system to said cap  
3 system, said substrate's temperature remains above approximately 100°C, thus  
4 preventing the condensation of moisture on said substrate, and said substrate is not  
5 exposed to an environment external to said apparatus.

1                    49.    An apparatus for processing substrates, comprising:  
2                    an atmospheric coating system;  
3                    a coating system transfer chamber disposed in said atmospheric coating  
4 system;  
5                    a coating system substrate handling member disposed in said first  
6 transfer chamber;  
7                    a loadlock chamber in communication with said coating system transfer  
8 chamber;  
9                    a cap system in communication with said loadlock chamber;  
10                  a cap system transfer chamber disposed in said cap system; and  
11                  a cap system substrate handling system disposed in said cap system  
12 transfer chamber.

1                    50.    The apparatus of claim 49 wherein said atmospheric coating  
2 system comprises:  
3                    one or more substrate coating modules in communication with said first  
4 transfer chamber; and  
5                    one or more substrate bake modules in communication with said first  
6 transfer chamber.

1                    51.    The apparatus of claim 50 wherein said substrate coating module  
2 comprises a spin-on deposition module.

1                    52.    The apparatus of claim 50 further comprising one or more  
2 substrate cooling modules in communication with said first transfer chamber.

1                    53.    The apparatus of claim 49 further comprising a vacuum pump in  
2 fluid communication with said loadlock chamber.

1                    54.    The apparatus of claim 49 wherein said cap system comprises:  
2                    one or more processing chambers, each one of said processing chamber  
3 defining at least one isolated processing region therein, wherein each processing region  
4 is connected with said third transfer chamber.

1                   55.     The apparatus of claim 54 wherein a vacuum pump is in fluid  
2 communication with said one or more processing chambers.

1                   56.     The apparatus of claim 54 wherein said processing region  
2 includes a gas distribution assembly disposed therein and each gas distribution  
3 assembly receives process gases from one or more gas sources.

1                   57.     The apparatus of claim 54 further comprising a plasma system  
2 having a RF generator connected with each processing region.

1                   58.     The apparatus of claim 49 wherein while a substrate is being  
2 processed in said apparatus, said substrate is unexposed to an environment that is  
3 external to said apparatus.

1                   59.     The apparatus of claim 49 wherein said coat system and said cap  
2 system are not in fluid communication with an environment external to said apparatus  
3 while a substrate is being processed in said apparatus, to prevent the exposure of said  
4 substrate to an environment external to said apparatus.

1                   60.     The apparatus of claim 49 wherein while a substrate is  
2 transferred from said coat system to said cap system, said substrate is not exposed to an  
3 environment external to said apparatus.